

TWO NEW SPECIES OF *PERLESTA* BANKS (PLECOPTERA: PERLIDAE) FROM EASTERN NORTH AMERICA

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Abstract.—Two new species in the Nearctic perlid stonefly genus *Perlesta* Banks are described from Virginia, USA. *Perlesta roblei*, n. sp., is described from Middlesex and King and Queen counties, and *P. puttmauni*, n. sp., is described from Hanover, Pittsylvania, and Prince William counties. The adult male, adult female, and egg are described and illustrated for both species.

Key Words: Plecoptera: Perlidae, *Perlesta*, new species, Nearctic, Virginia

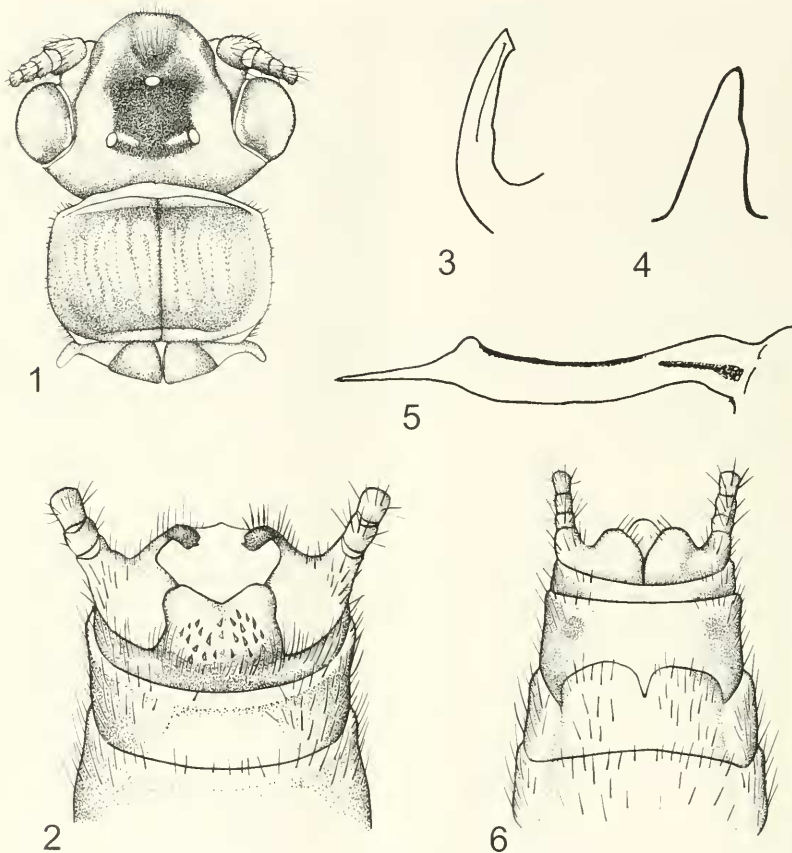
Remarkably, the Nearctic stonefly genus *Perlesta* Banks currently includes 19 species, whereas during most of the 20th century only a single widespread species was recognized (Stark 1989). Stark, in his 1989 revision, provided a firm taxonomic basis that has allowed an additional seven species to be described (Poulton and Stewart 1991, Stark and Rhodes 1997, Kirchner and Kondratieff 1997, DeWalt et al. 1998, Kondratieff and Baumann 1999, Kondratieff and Kirchner 2002, DeWalt 2002). Recently, DeWalt et al. (2001) provided a review of the genus in Illinois, recording eight species.

Kondratieff and Kirchner (1987) listed the stoneflies of Virginia. Subsequently, Stark (1989) and Kirchner and Kondratieff (1997) indicated that four species of *Perlesta* occurred in Virginia: *P. decipiens* (Walsh), *P. frisoni* Banks, *P. placida* (Hagen), and *P. teaysia* Kirchner and Kondratieff. Over the last several years Dr. Richard L. Hoffman, Virginia Museum of Natural History, submitted stonefly specimens to the authors for identification, among which

were several new species of *Perlesta*. The authors collected additional adult material of two of these species, especially males with extruded penis tube + sac for comparative descriptions from several sites in the Piedmont and Coastal Plain physiographic regions of Virginia (Kondratieff and Kirchner 1987). These two species are described here. The terminology for the adults follows Stark (1989).

Perlesta roblei Kondratieff and Kirchner, new species (Figs. 1–8)

Male.—Forewing length 8–9 mm. Head yellow with a large black to brown ocellar patch and large diffuse dark spot anterior to patch, prothorax black (Fig. 1). Forewing membrane and veins dark brown to black except for pale costal margin, pale areas proximal to arculus, along median vein anterior to cord, and in intercubital area. Femora yellow, distally and dorsally brown, tibiae brown with apices yellow. Abdominal terga black to brown posteriorly, yellowish anteriorly; sterna yellow. Cercus yellow ba-



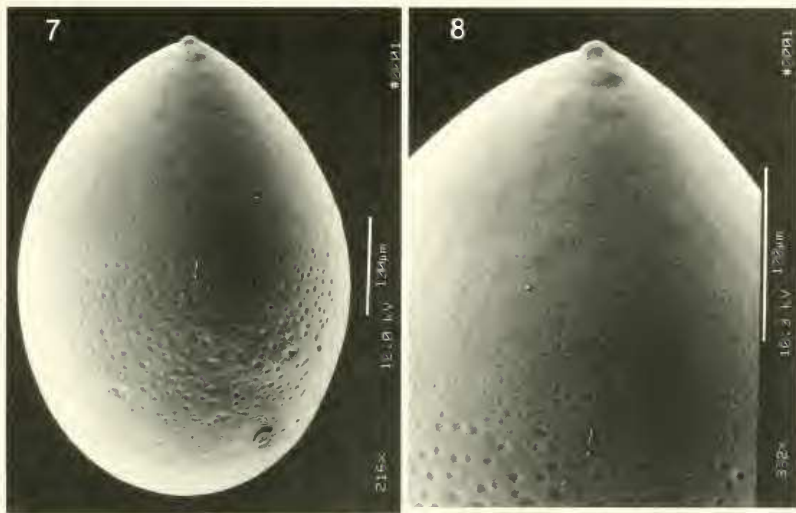
Figs. 1-6. *Perlesta roblei*. 1. Adult head and pronotum. 2. Male terminalia, dorsal. 3. Paraproct, lateral. 4. Paraproct, caudal. 5. Penis. 6. Female subgenital plate, ventral.

sally, each segment posteriorly brown, distal segments brown. Tergum 10 mesal sclerite brown, partially divided, sensilla basiconica distinct but small, not elevated into patches (Fig. 2). Paraproct in lateral view, long, slightly curved posteriad at apex, small anteapical tooth scarcely visible (Fig. 3) and not visible in caudal aspect (Fig. 4) [terminalia often need to be cleared to observe these characters]. Penis tube + sac

long, caecum reduced (Fig. 5), dorsal patch narrow.

Female.—Forewing length 10–12 mm. Color pattern similar to male but paler. Subgenital plate lobes rounded to truncate and separated by a deep V-shaped notch (Fig. 6).

Egg.—Collar buttonlike (Figs. 7–8). Chorion surface with wide mesal band of shallow punctations. Eclosion line absent (Fig. 7).



Figs. 7–8. *Perlesta roblei*. Scanning electron photomicrograph of egg. 7, Entire egg, 216 $\times$. 8, Closeup of collar, 382 $\times$.

Nymph.—Not examined.

Material examined.—Holotype: ♂, VIRGINIA: Middlesex Co., Dragon Run, County Rte. 603, East Mascot, 37°38'0.9"N, 76°41'46.1"W, 22 May 2002, B. Kondratieff and R. Kirchner. Paratypes: Same as holotype, 27 ♂, 8 ♀; King and Queen County, Dragon Run, Big Island, 22 May 2002, Kondratieff, Kirchner, and Roble, 3 ♂, 4 ♀; Dragon Run Swamp, County Rte 603, NE Mascot, 19 May 2000, VDNH Survey, 2 ♂, 1 ♀.

The holotype is deposited at the National Museum of Natural History, Smithsonian Institution, Washington, D.C. Paratypes are deposited in the following museums and individual collections: Bill P. Stark, Clinton, Mississippi; C. P. Gillette Museum of Arthropod Diversity, Colorado State University; Illinois Natural History Survey, Urbana; Ralph F. Kirchner, Huntington, West Virginia; and the Virginia Museum of Natural History, Martinsville.

Etymology.—We honor Dr. Steven M.

Roble, Virginia Department of Conservation and Recreation. His passion for the preservation of rare and imperiled insects of Virginia is exemplary.

Diagnosis.—*Perlesta roblei* is generally similar to at least eight species listed in Table 1. The male of *P. roblei* would key to couplet 6 in Stark (1989), including *P. adena* Stark and *P. cinctipes* (Banks), and is similar to both species, and *P. xube* Stark and Rhodes. However, the male of *P. roblei* differs in the structure of the paraprocts or aedeagus from both *P. adena* (see Stark 1989, figs. 71, 76), *P. cinctipes* (see Stark 1989, figs. 28, 32), and *P. xube* (see Stark and Rhodes 1997, figs. 3–4, 6). The caecum of the aedeagus of *P. roblei* (Fig. 5) is reduced, distinguishing it from both *P. adena* and *P. xube*. In *P. roblei* the small antecapical tooth of the paraproct is scarcely visible in lateral view (Fig. 3), whereas in *P. cinctipes*, the mesoapical tooth of the paraproct is clearly visible in lateral view.

The egg of *P. roblei* is similar to *P. ad-*

Table 1. Comparison of the dark species of *Perlesta*.

Species	Tergum 10	Paraprocts in Lateral View	Caecum	Femora Pigmentation	Egg Collar	Geographic Range
<i>adena</i>	almost divided	long, slender mesoapical tooth	long/large	dorsal band	buttonlike	TN, OH
<i>baumanni</i>	entire	short, strongly curved apical tooth	unknown	distodorsal band	unknown	Quachita Mountains
<i>browni</i>	entire	long, slender mesoapical tooth	long	banded	short	Ozark-Quachita
<i>cinctipes</i>	partially divided	long, slender mesoapical tooth	long	banded	short, wide	midwestern to Ozarks
<i>dakota</i>	entire	long, slender subapical tooth indistinct	long	broad dorsal band	buttonlike to obscure	ND, SD
<i>etnieri</i>	entire	long, slender small mesoapical tooth	absent	dorsal band	obscure	TN
<i>fusca</i>	partially divided	short-triangular small apical tooth	reduced	distodorsal band	obscure	Ozarks
<i>roblei</i>	partially divided	long, slender mesoapical tooth	reduced	dorsal band	buttonlike	VA
<i>xube</i>	almost divided	long, slender, subapical tooth directed mesad	short	foreleg, dorsal band; mid/hind banded	obscure	NE to IL

ena, *P. bolutka* Stark, *P. dakota*, *P. fusca* Poulton and Stewart, *P. lagoi* Stark, *P. nitida* Banks, and *P. xube*. From the other known Virginia species, the small buttonlike collar distinguishes the egg of *P. roblei*.

Additionally, the darker coloration of the body and the deep V-shaped notch of the subgenital plate separate the female from all known sympatric species.

Remarks.—Dragon Run is a low gradient black-water stream that flows into the Piankatank River of the Chesapeake Bay. At the type locality, *Vallisneria americana* Michx. is common in the swifter zones of the stream, and the dominant riparian cover is *Taxodium distichum* (L.) Rich. The elevation at the site is 7.6 m and the stream gradient 0.5 m/km. Other adult stoneflies collected at the type locality were *Isoperla* nr. *davisi* James and another undescribed species of *Perlesta*.

***Perlesta puttmanni* Kondratieff and
Kirchner, new species**
(Figs. 9–15)

Male.—Forewing length 8–9 mm. General body color yellowbrown. Head yellow

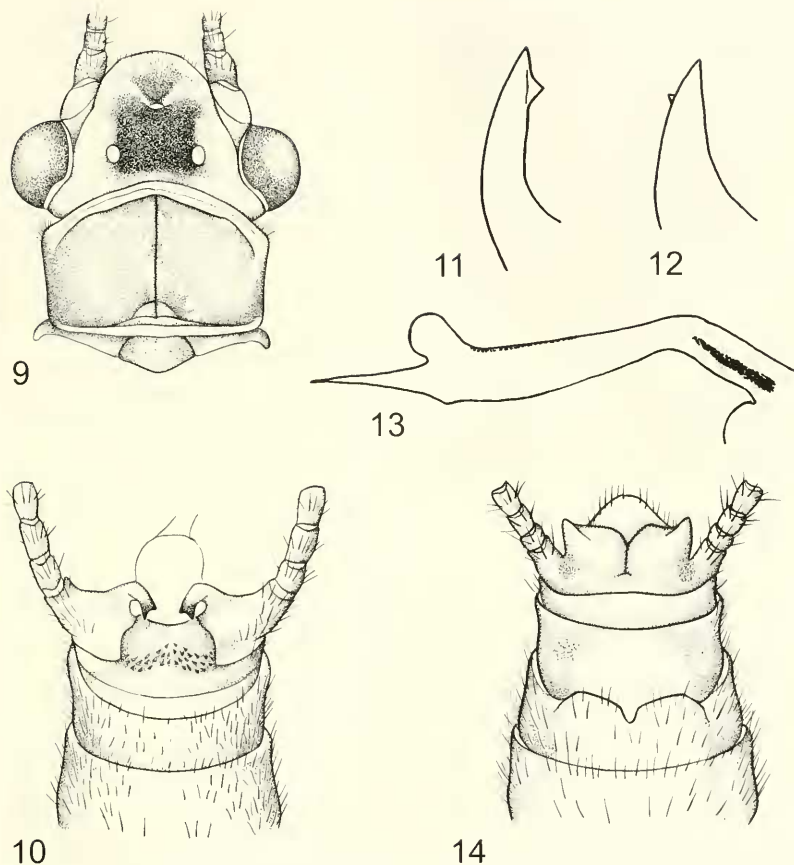
except for brown quadrangular area over ocelli, and small brown triangular area forward of median ocellus (Fig. 9). Wings yellow brown to amber. Femora with dusky brown dorsal band. Tergum 10 mesal sclerite light brown, not divided, sensilla basiconica distinct but small, not elevated into patches (Fig. 10). Paraproct short, stout, broad at base, with a prominent subapical mesad directed tooth (Fig. 11), visible in caudal view (Fig. 12). Penis tube + sac long, caecum prominent, long as wide, lateral sclerite prominent, dorsal patch narrow (Fig. 13).

Female.—Forewing length 9.5–10.5 mm. Subgenital plate with short broad lobes separated by shallow triangular notch (Fig. 14).

Egg.—Distinct collar short, anchor pedicel composed of many filaments (Fig. 15). Chorion finely punctate. Micropylar row set around anterior surface of eclosion line (Fig. 15).

Nymph.—Not examined.

Material examined.—Holotype: ♂, VIRGINIA: Hanover Co, South Anna River, Co. Rte. 657, 37°47'5.4"N 77°35'5.9"W, 23 May 2002, B. Kondratieff and R. Kirchner. Paratypes: Same data as holotype, 6 ♂, 2



Figs. 9–14. *Perlesta puttmanni*. 9, Adult head and pronotum. 10, Male terminalia, dorsal. 11, Paraproct, lateral. 12, Paraproct, caudal. 13, Penis. 14, Female subgenital plate, ventral.

♀; Pittsylvania Co., Banister River, Co. Rte. 640, 21 May 2002, B. C. Kondratieff and R. F. Kirchner, 2 ♂; Prince William Co., Cedar Run, 0.4 km S Camp Upshur, Quantico Marine Corps Base, 7 June 1999, A. C. Chazal, 13 ♂, 6 ♀; same but Copawamsic Creek, 9 June 1999, 3 ♂, 4 ♀.

The holotype is deposited at the National Museum of Natural History, Smithsonian

Institution, Washington, D.C. Paratypes are deposited in the following museums and individual collections: Bill P. Stark, Clinton, Mississippi; C. P. Gillette Museum of Arthropod Diversity, Colorado State University; Illinois Natural History Survey, Urbana; Ralph F. Kirchner, Huntington, West Virginia; and the Virginia Museum of Natural History, Martinsville.



Fig. 15. *Perlesta puttmanni*. Scanning electron photomicrograph of egg, 216 $\times$.

Etymology.—We honor Steven J. Puttmann, Colorado Division of Wildlife, for his many contributions to the natural history of Colorado. His zeal to enhance the aquatic communities of Colorado is appreciated.

Diagnosis.—With the large prominent directed tooth of the paraproct (Fig. 11), the male of *P. puttmanni* could key to couplet 11 of Stark (1989), which includes *P. nitida* and *P. bolukta*. However, *P. puttmanni* is easily distinguished by the prominent mesoapical inwardly directed paraproctal tooth (Fig. 11), paraprocts curved in caudal view with point of tooth visible (Fig. 12), and the narrow spinule patch of the aedeagal tube (for *P. nitida*, see Grubbs and Stark 2001, fig. 1 and for *P. bolukta*, see Stark 1989, fig. 88). The general habitus of the male of *P. puttmanni* is similar to the sympatric *P. placida*, but the male of *P. placida* is readily characterized by the thin paraprocts usually lacking a tooth in lateral view (See Stark 1989, fig. 22). The subgenital plate of *P. puttmanni* (Fig. 14) is similar to *P. shu-*

buta Stark, but the anchor pedicel of the egg is composed of many filaments (Fig. 15).

Remarks.—Other stoneflies known from the South Anna River include *Allocapnia rickeri* Frison, *Amphinemura nigritta* (Provancher), *Taeniopteryx maura* (Pictet), *T. parvula* Banks, *Strophopteryx fasciata* (Burmeister), *Paragnetina fumosa* Banks, *Agnentina flavescens* (Walsh), *Acroneuria abnormis* (Newman), *Perlesta placida* (Hagen), *P. decipiens* (Walsh), *Suwallia marginata* (Banks), *Helopicus subvarians* (Banks), *Isoperla* spp., and *Pteronarcys dorsata* (Say). The ecology of several species of insects has been extensively studied from this river (Kondratieff and Voshell 1980, Parker and Voshell 1982). The South Anna River at the type locality is characterized by a long series of riffles, beds of *Justicia americana* (L.), and mats of *Podostemum ceratophyllum* Michaux on the rocks. The elevation at the site is 38 m and the gradient 3.4 m/km.

ACKNOWLEDGMENTS

We thank Bill P. Stark of Mississippi College for confirming the specific status of both species and the fine SEM photographs. Dr. Richard L. Hoffman is thanked for making material available and for guiding us to some of the collection sites. Steven M. Roble made arrangements for us to access the Dragon Run sites, and joined us in the field. The views of R. E. Kirchner do not purport to reflect the position of the Department of the Army or the Department of Defense.

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